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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/620,073	07/20/2000	David R. Hall		3609

7590 07/23/2004

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EXAMINER	
WONG, ALBERT KANG	
ART UNIT	PAPER NUMBER
2635	10

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/620,073	HALL ET AL.	
	Examiner	Art Unit	
	Albert K Wong	2635	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-30 and 32-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-30 and 32-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This Office action is in response to the amendment filed May 28, 2004. Claims 17-30 and 32-43 are pending. Claims 17, 30, and 32 have been amended. The prior rejections of the claims have been withdrawn in view of the amendments and remarks.

2. The declaration to correct inventorship has been approved by the Examiner.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 17-30 and 32-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard '071.

Regarding claim 17, Howard teaches the claimed plurality of downhole components with two ends which are detachably joined at their respective ends in figures 4 and 6, items 219 and 319. A first coupled inductive transmission device is taught as item 379. Howard teaches that the second transmission device is a Hall sensor. However, Howard also teaches in col. 8, ~~lens~~ lines 37-43 that the Hall sensor is a replacement for a transformer coil which constitutes a coupled inductive transmission device. It would have been obvious to use two inductive coils instead of a coil and a Hall sensor as suggested by Howard. Coils do not require a power source as taught by Howard. When the inductive devices are coupled, the devices are spaced apart in a set relationship to form a communication system. Howard does not teach the distance between pairs of devices being substantially constant. One of ordinary skill in the art would be familiar with electrical systems, Hall effect devices and modern manufacturing techniques. The coupling of

signals via inductive principles is dependent on the distance between the emitter and sensor. Thus, it would have been obvious that it is desirable to keep the distance as small as possible to maximize signal transmission without the shorting out the system. Further, it would have been obvious to manufacture mechanical components with sufficient tolerances so that the parts are interchangeable. This is a fundamental principle in modern mechanical systems and allows the creation of devices without the need for a technician to modify parts to permit interoperability. It would have been obvious to use interchangeable components such that the distance between the transmission devices are constant to eliminate the need to test each joint for the proper transmission characteristics.

Regarding claims 18 and 20, the system in Howard includes pipes for a drill string for an oil well.

Regarding claim 19, Figure 6 shows the claimed tool joints. Inductive coils would certainly function within the ranges between .003 and .010 inches. It would have been obvious to select any suitable distance. A closer range would give better signal conduction at the expense of more precision parts.

Regarding claim 21, the system in Howard transmits data. The wireless transmission of data requires the transmission of power.

Regarding claim 22, one of ordinary skill in the art would be familiar with well tubing joints and would be aware that the torque affects the coupling distance. The spaced relationship between the transmitters is a function of the torque in the pipe sections. The selection of a particular distance between transmitter components at specific torque levels is an obvious design

choice based upon the location of the components. It would have been obvious to select any suitable torque because it is not critical to the invention.

Regarding claim 23, the selection of the makeup torque is an obvious design choice since a range of torque is sufficient. Higher makeup torque relative to the maximum joint strength would increase the risk of joint failure but would give a more reliable connection.

Regarding claims 24, 27, and 28, the additional torque sustainable is an obvious design choice based on the strength of the joint and the selection of the makeup torque value.

Regarding claims 25 and 26, see figure 6.

Regarding claims 29, the distance between the paired communication devices is dependent on the coupling of the joints. Thus, a tighter coupling results in less distance between the transmission devices. The selection of a particular coupling distance at a particular torque is considered an obvious design choice since it is not critical to the invention. One may select various torque values to achieve the same coupling distance.

Regarding claim 30, col. 14 teaches the use of a thermocouple sensor.

Regarding claim 32, this claim combines the limitations of claims 17, 18, and 19. These limitations have been shown to be obvious and the combinations of these elements are similarly obvious as recited in the above claims.

Regarding claims 33-42, these limitations have been addressed in the claims rejected above and are similarly rejected.

Regarding claim 43, col. 13 teaches the use of a temperature sensor. The sensor data is communicated using the drill string communication system. A thermocouple is a temperature sensor. It would have been obvious to use any suitable temperature sensor to sense temperature.

Further, col. 15 teaches the sensing of various conditions within a wellbore. Although the specific sensor type is not recited, it is understood by one of ordinary skill at the time of the invention that the condition sensed are done by the specific sensors as recited in the claims of the instant application.

Remarks

5. Applicant has amended the claims to recite components using at least two coupled inductive transmission devices. Howard teaches in col. 8, lines 37-43 the use of a Hall effect sensor in place of an inductive transmission device. This does not constitute a teaching away. Howard is merely stating the desirability of using a Hall sensor as a substitute for coupled inductive devices (i.e. coils). Thus, there is a clear suggestion of the use of such devices in a downhole communicative structure that is substantially similar to applicant's claims invention.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert K Wong whose telephone number is 703-305-8884. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik can be reached on 703-305-4704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Albert K. Wong
July 22, 2004